III. "On the Corrections of Bouvard's Elements of Jupiter and Saturn (Paris, 1821)." By Hugh Breen, formerly of the Royal Observatory, Greenwich. Communicated by Professor G. G. Stokes, Sec. R. S. Received December 17, 1868.

The Tables of Jupiter and Saturn which have been used for some years past in the computations of the 'Berliner Jahrbuch' and 'Nautical Almanac,' differ more from observation than is consistent with the present requirements of astronomy; and, moreover, abundant means for the correction of Bouvard's 'Elements' exist in the publication of the Greenwich Planetary Observations, 1750–1835, and the annual volumes issued from the Royal Observatory since 1836. The present work, which has been undertaken for this purpose, is based exclusively on the Greenwich Observations, 1750–1865.

Each mean group of observations in the Greenwich Planetary Reductions &c. gives the mean error of the planet's tabular geocentric place, with its equivalent in terms of the heliocentric errors of the earth and planet; but in the present investigation the places of Carlini's Solar Tables, which have been used throughout the whole period (with the exception of 1864 and 1865), have been accepted without alteration; for Jupiter and Saturn the factors of the earth's heliocentric errors are so small, that the difference of Carlini's Solar Tables from the recent investigations of Leverrier may be neglected.

The coefficients of the errors of the elements in heliocentric longitude and radius vector, for different values of the mean anomaly, are calculated in the usual way; and the formation of the equations of condition is effected by their multiplication by the printed factors of the heliocentric errors of the planet in the Greenwich Observations. A weight is assigned to each equation of condition, dependent on the number of observations in the group, and the relation of the geocentric and heliocentric errors. The equations thus, multiplied by the weights, are then solved by the method of least squares. The results are given in the following Table:—

Jupiter.

1750, October 29, to 1771, July 14.

$$\delta a = -\ 0{\cdot}000331873.$$
$$\delta e = +\ 0{\cdot}00000123252.$$
$$\delta t = -\ 4''{\cdot}284354.$$
$$\delta \varpi = -22''{\cdot}36544.$$
$$\delta \mathrm{I} = -\ 0''{\cdot}311.$$
$$\delta \mathrm{N} = +99''{\cdot}1819 \text{ (neglecting } \delta l \text{ as insensible).}$$

δa is the error of the planet's semiaxis major, δe is the error of the eccentricity, δt is the error of the epoch of the mean longitude, and $\delta \varpi$ is the error of the longitude of the perihelion, δI is the error of the inclination, and δN is the error of the longitude of the node.

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1772, August 31, to 1810, January 9.

$$\delta a = -\ 0{\cdot}000181527.$$
$$\delta e = -\ 0{\cdot}00000211230.$$
$$\delta t = -\ 1''{\cdot}50080.$$
$$\delta \varpi = -41''{\cdot}7566.$$
$$\delta \mathrm{I} = -\ 0''{\cdot}561.$$
$$\delta \mathrm{N} = +24''{\cdot}911.$$

1811, February 12, to 1839, May 30.

$$\delta a = -\ 0{\cdot}0000355943.$$
$$\delta e = +\ 0{\cdot}00000126876.$$
$$\delta t = -\ 2''{\cdot}94891.$$
$$\delta \varpi = -58''{\cdot}9578.$$
$$\delta \mathrm{I} = -\ 1''{\cdot}433.$$
$$\delta \mathrm{N} = -72''0634.$$

1840, January 18, to 1865, August 8.

$$\delta a = -\ 0{\cdot}000166480.$$
$$\delta e = -\ 0{\cdot}00000677360.$$
$$\delta t = -\ 4''{\cdot}88982.$$
$$\delta \varpi = -\ 77''{\cdot}3245.$$
$$\delta \mathrm{I} = -\ 1''{\cdot}668.$$
$$\delta \mathrm{N} = -118''{\cdot}266.$$

Saturn.

The tabular results of the 'Nautical Almanac' and 'Berlin Ephemeris' have been reduced to the value of the mass of Jupiter adopted in the Greenwich Planetary Reductions, 1750–1830; and the equations are formed as before mentioned.

1751, February 19, to 1783, September 28.

$$\delta a = +\ 0{\cdot}00048429.$$
$$\delta e = -\ 0{\cdot}000035957.$$
$$\delta t = -\ 7''{\cdot}86558.$$
$$\delta \varpi = +214''{\cdot}9774.$$
$$\delta \mathrm{I} = -\ 10''{\cdot}7538.$$
$$\delta \mathrm{N} = -157''{\cdot}156.$$

1784, July 12, to 1814, July 19.

$$\delta a = +\ 0{\cdot}0000371094.$$
$$\delta e = -\ 0{\cdot}00000436038.$$
$$\delta t = -\ 4''{\cdot}38974.$$
$$\delta \varpi = +121''{\cdot}9323.$$
$$\delta \mathrm{I} = -\ 9''{\cdot}046.$$
$$\delta \mathrm{N} = +107''{\cdot}67.$$

1815, July 29, to 1839, July 13.

$\delta a = +\ 0{\cdot}00081572.$
$\delta e = +\ 0{\cdot}000000334917.$
$\delta t = -\ 6''{\cdot}71499.$
$\delta \pi = +\ 40''{\cdot}71125.$
$\delta \mathrm{I} = -\ 10''{\cdot}418.$
$\delta \mathrm{N} = +\ 95''{\cdot}207.$

1840, March 9, to 1865, June 9.

$\delta a = +\ 0{\cdot}00076325.$
$\delta e = +\ 0{\cdot}0000286012.$
$\delta t = -\ 2''{\cdot}89008.$
$\delta \pi = -\ 3''{\cdot}47275.$
$\delta \mathrm{I} = -11''{\cdot}233.$
$\delta \mathrm{N} = +38''{\cdot}16.$

IV. "On the Structure of the Red Blood-corpuscle of Oviparous Vertebrata." By William S. Savory, F.R.S. Received February 20, 1869.

The red blood-cell has been perhaps more frequently and fully examined than any other animal structure; certainly none has evoked such various and even contradictory opinions of its nature. But without attempting here any history of these, it may be shortly said that amongst the conclusions now, and for a long time past, generally accepted, a chief one is that a fundamental distinction exists between the red corpuscle of Mammalia and that of the other vertebrate classes—that the red cell of the oviparous vertebrata possesses a nucleus which is not to be found in the corpuscle of the other class. This great distinction between the classes has of late years been over and over again laid down in the strongest and most unqualified terms.

But I venture to ask for a still further examination of this important subject.

As the oviparous red cell is commonly seen, there can be no doubt whatever about the existence of a "nucleus" in its interior. It is too striking an object to escape any eye; but I submit that its existence is due to the circumstances under which the corpuscle is seen, and the mode in which it is prepared for examination. I think it can be shown that the so-called nucleus is the result of the changes which the substance of the corpuscle undergoes after death (and which are usually hastened and exaggerated by exposure), and the disturbance to which it is subjected in being mounted for the microscope. When a drop of blood is prepared for examination, little or no attention is given to the few seconds, more or less, which are consumed in the manipulation. It is usually either pressed or spread out on the glass slip, and